ACTUARIAL REPORT

on the

CIVIL SERVICE SUPERANNUATION FUND

as at

DECEMBER 31st, 1989

TURNBULL AND TURNBULL

The Chairman and Members of
the Superannuation Board,
Civil Service Superannuation Fund,
Winnipeg, Manitoba.

1. Introduction

This Report presents the results of the Actuarial Valuation of the Civil Service Superannuation Fund (Fund) made as at December 31st, 1989.

The purpose of this valuation is to:

(a) determine the financial position of the Fund as at the valuation date,

(b) determine the adequacy of the contribution rates in relation to the portion of the benefits financed by the Fund, and

(c) provide recommendations as to the future course of action based on the financial position revealed.

The financial position of the Fund is determined on the basis of those persons who are participating in the Fund at the valuation date. Separate information is provided to indicate the expected financial effect of the participation of employees who begin to contribute after the valuation date.

Each year the Fund receives contributions and investment income and pays benefits and expenses. This process continues for as long as there are contributors and persons entitled to benefits.

Each employee contributes while in service, and either that employee or that employee's beneficiary becomes entitled to benefits when that service terminates.

The amount received by the Fund or paid out of the Fund in future will depend upon future experience and the requirements contained in the Civil Service Superannuation Act (Act), as it exists from time to time.

The Actuary of the Fund estimates these amounts by:

(a) anticipating that there will be no further amendments to the Act, and

(b) making assumptions concerning future experience.

These assumptions are based on actual experience in relevant prior periods. The actual experience is modified where

necessary to reflect expected future trends. The choice of assumptions is discussed in a subsequent section of this Report. These assumptions are needed in order to determine:

(a) the probability that an employee participating in the Fund on the valuation date will still be an employee at each age in the future,

(b) the contributions that will be paid by such an employee at each age in the future,

(c) the probability that, at each age in the future, one of the following events will occur to an employee participating in the Fund on the valuation date: retirement, death, disablement, resignation or dismissal,

(d) the probability that an employee who dies in service will have an eligible survivor,

(e) the amount which will be paid at each age in the future if the event occurs at that age, and

(f) the investment income which can be earned on the assets and future contributions from the valuation date or the date received until the date the benefit payments and expenses become due.

Some of the present participants in the Fund will likely still be contributing to the Fund each year for at least the next 45 years. Some of the present participants will be entitled to receive benefits from the Fund each year for at least the next 65 years. Contributions are made throughout service and benefits become due only after service ceases. As a result, income is received and expenditures are incurred at different times in the future.

It is possible to compare these amounts at a single date, such as a valuation date, only by computing the present value of each item of income and expenditure. The present value of an item of income is the amount which, if available now and invested at the assumed rate of return, would accumulate over the years to exactly the same amount as is expected to be received at a specified date in the future. The present value of an item of expenditure is the amount which, if available now and invested at the assumed rate of return, would accumulate over the years so that there would be exactly sufficient proceeds of such investment available to pay the expenditure as it becomes due.

The results of these computations are shown in the Valuation Balance Sheet.

2. Source of Information

The information used in this valuation was provided by the staff of the Superannuation Board.

The information on which the valuation is based included the following:

(a) Computer tapes which provided information for each employee as at December 31st, 1989. Details of the information provided included: employer code, social insurance number, employee number, sex, date of birth, date of entry into the Fund, salary rate at December 31st, 1989, the proportion of 1989 worked, required employee contributions and total interest on these contributions accumulated to the valuation date. Accumulated contributions and pensionable service were shown separately in respect of service prior to January 1st, 1985 and after December 31st, 1984.

(b) Computer tapes which provided information for each pensioner as at December 31st, 1989. Details of the information provided included: employer code, name, social insurance number, sex, date of birth, date of commencement of pension, type of pension, and amount of monthly pension. For each pensioner, the portion of the pension charged to the Fund, now and in the future, was also provided. Similar information was provided for each beneficiary or potential beneficiary.

(c) Information for each former employee who was entitled to a deferred pension as at December 31st, 1989. Details of the information provided included: employer code, employee identification number, sex, date of birth, age at which pension is expected to commence, and amount of pension payable.

(d) A list of transfers to Reciprocating Employers outside of Manitoba and to Reciprocating Manitoba Employers.

(e) A list of terminations which occurred prior to January 1st, 1990, but for whom refunds were not processed until after that date.

(f) A list of marriage breakup cases which have been processed, and the resulting pension reductions.

(g) A record of the general increases in salary granted to employees during 1987, 1988 and 1989.

(h) A list of changes made to the basic information, such as: sex, department number, employee identification number, date of birth, and date of entry into service.

(i) Information indicating the instalment payments received by the Fund up to December 31st, 1989 in respect of non-pensionable employment and war service from contributors who still had payments to make as at December 31st, 1989.

(j) The financial statements of the Fund, including the balance sheet and income and expenditure statements for 1987, 1988 and 1989.

(k) The Annual Reports of the Superannuation Board for 1987, 1988 and 1989.

(l) A detailed list of investments held as at December 31st, 1989.

(m) A copy of the Act, with amendments to December 31st, 1989.

In addition, we had available copies of prior Actuarial Reports on the financial position of the Fund.

The membership of the Fund was reconciled with the membership of the Fund as at December 31st, 1986 and changes in status reported since that date.

Approximately 750,000 separate items of data were provided for this Report. This data was reviewed for missing information and illogical information. The data was also compared to the data provided as at December 31st, 1986.

We were made aware of most items of information that had to be added or changed.

As a result of the editing procedures, we also identified approximately 125 records for which some item of information had to be added or changed. The small number of changes is a reflection of the quality of the work done by the staff of the Board.

3. Membership of the Fund

The information supplied indicated that the membership of the Fund was as follows:

	December 31st, 1989	December 31st, 1986
Employees		
- Males	17,053	16,845
- Females	12,427	11,126
Pensioners		
- Males	4,441	3,612
- Females	1,933	1,582
- Beneficiaries	1,103	859
Former employees who transferred to a Reciprocating Manitoba Employer and who are entitled to deferred pensions		
- Males	128	76
- Females	85	40
Former employees entitled to deferred pensions		
- Males	506	264
- Females	486	189
Total	38,162	34,593

4. Operation of the Fund

(a) Amendments to the Act

A number of amendments have been made to the Act since December 31st, 1986. Those amendments which had a financial effect are described below:

(i) Effective January 1st, 1989, the Act was amended to permit the transfer of the surplus revealed in the Fund at December 31st, 1986 to the Superannuation Adjustment Account. This transfer is intended to prefund a portion of future pension adjustments. The amount to be transferred is equal to $31,788,810 as at January 1st, 1989.

As part of this amendment, the formula for calculating pension adjustments has been modified. Until such time as there is 20-year prefunding of future pension adjustments, the maximum adjustment is limited to 2/3 of the increase in the C.P.I.

This amendment decreased the surplus of the Fund by $26,633,700 as at December 31st, 1986.

(ii) Effective October 19th, 1988, the Act was amended to extend permanently the crediting of interest at the rate of 3% per year on contributions made for service prior to January 1st, 1984.

Previously, the Act provided for the crediting of interest at 3% per year on these contributions only up to December 31st, 1986.

This amendment increased the liabilities of the Fund by $652,200 as at December 31st, 1986.

(iii) Effective July 1st, 1990, the Act was amended so that participating employers are required to pay 50% of the administrative expenses incurred by the Board.

Previously, all administrative expenses were paid out of the Fund.

The employers will not pay any of the costs of managing investments of the Fund.

This amendment decreased the liabilities of the Fund by $1,392,500 as at December 31st, 1986.

(iv) Effective January 1st, 1990, the Act was amended to lock-in pensions accrued by employees for service on and after

January 1st, 1985. This lock-in occurs after the completion of 2 years of service.

Previously each employee's contributions and accrued pension for this service was locked in after the completion of 5 years of service.

This amendment increased the liabilities of the Fund by $383,400 as at December 31st, 1986.

In total, these amendments caused a reduction in the surplus of the Fund equal to $26,276,800 as at December 31st, 1986.

(b) Investment Reserve

An amount equal to 1/10 of 1% of the book value of investments is transferred each year to the investment reserve from investment income. The reserve can not exceed 1% of the book value of investments.

An impairment in the value of investments, considered to be permanent by the Investment Committee, is charged to the investment reserve.

The investment reserve was equal to $940,000 as at December 31st, 1989.

5. Experience of the Fund

The valuation is based on a set of assumptions as to those factors which will affect the Fund financially in future years. The factors which are of financial significance to the Fund are:

(a) the rate of return assumed to be earned on the invested assets of the Fund,

(b) the rate at which salaries increase,

(c) the rate of increase in earnings under the Canada Pension Plan,

(d) the rate at which interest is expected to be credited on required contributions,

(e) the expenses of administering the Fund,

(f) the incidence of death after the date the pension commences,

(g) the incidence of death prior to the date the pension commences and the proportion of employees with a spouse,

(h) the incidence of termination of service and the proportion of terminating employees who elect a deferred pension,

(i) the incidence of becoming disabled, and

(j) the incidence of retirement.

Assumptions are developed in respect of each of these factors in order to determine:

(i) the amounts of the contributions expected to be received and the benefits expected to be paid in each future year on the basis of the present provisions of the Act, and

(ii) the present value of these expected contributions and benefits for the purposes of establishing the present financial position of the Fund.

The assumptions can be divided into the following 2 general categories:

(a) those assumptions which are based on economic conditions or on factors which are not related to changes in status occurring among members of the Plan (economic assumptions), and

(b) those assumptions which indicate the expected utilization of benefits at each age in the future (utilization assumptions).

The economic assumptions consist of:

(a) the rate of return which is assumed to be earned on the Fund,

(b) the rates at which salaries are assumed to increase (due to inflation and productivity only),

(c) the rate of increase in earnings under the Canada Pension Plan,

(d) the rate at which interest is expected to be credited to required contributions, and

(e) the expenses of administering the Fund.

The economic assumptions were reviewed by a study of actual experience of the Fund during the valuation period and the general economic experience during the 20-year period ending December 31st, 1989. The last complete study of such experience was made for the 1986 Report.

The experience concerning the utilization of benefits has been studied over the 3-year period ending December 31st, 1989 and the 9-year period ending December 31st, 1989. The experience prior to this time is not as useful in developing the rates since it does not reflect subsequent changes in the Act and in the level of economic activity. The last complete study of such experience was made for the 1986 Report.

The number of deaths, terminations, disablements, and retirements which actually occurred during these periods were compared to the number expected to occur. The numbers expected to occur were calculated by using the rates of utilization assumed in the 1986 Report.

Any differences between the actual experience and the expectations based on the existing assumptions have been analyzed. Where appropriate, the assumptions previously used have been modified to reflect the results of this study of the experience.

(a) <u>Rate of Return on the Assets of the Fund</u>

Rates of return have been calculated for the total assets of the Fund. Rates of return have also been calculated for the fixed income and equity portions of the Fund.

The fixed income portion of the Fund includes bonds, short-term investments, mortgages, units of pooled fixed income investment funds, accumulated unrealized gains or losses on foreign exchange and accrued interest.

The equity portion of the Fund includes common shares, preferred shares, shares or units of pooled equity investment funds, real estate equity investments, accumulated unrealized appraisal adjustments, unamortized gains or losses on disposition and accrued interest.

The total assets of the Fund consist of the fixed income portion, the equity portion, computer equipment and development expenses, furniture and fixtures, cash, plus any amounts receivable less any amounts payable as at December 31st of each year.

The rates of return earned on the assets of the Fund each year during the last 6 years are shown in the following table:

Year Ending December 31st	Fixed Income Portion	Equity Portion	Total Fund
1984	12.31%	8.03%	11.55%
1985	12.32	9.53	11.72
1986	12.10	9.22	11.45
Average	12.24%	8.93%	11.57%
1987	11.28%	8.75%	10.73%
1988	11.23	8.04	10.59
1989	11.50	7.98	10.77
Average	11.34%	8.26%	10.70%

The rates of return on the fixed income portion of the Fund are based on the amortized cost of the fixed income investments. The income on this portion of the Fund consists of interest earned each year plus any accumulated unrealized foreign exchange gains or losses credited to income.

The rates of return on the equity portion of the Fund are based on the book value of the equity investments, as shown in the accounts of the Fund. The income on this portion of the Fund consists of dividend income plus 1/5 of the difference between adjusted book value and the market value plus 1/5 of the realized gains or losses of the current year and prior 4 years.

All of these amounts are adjusted for amounts allocated to the investment reserve.

In our 1986 Report, it was assumed that the rate of return would be 9.25% per year. The rates of return earned during 1987, 1988 and 1989 compare favourably with the assumed rate of return.

An actuarial valuation relates to events which are expected to happen in the future. As a result, the rates of return earned in past years are important only to the extent that they constitute a good indication of the rates of return which can be expected to be earned in the future. The rate of return assumed in an actuarial valuation should represent a reasonable balance between current rates of return and the level of investment earnings expected to be realized in the future.

An indication of the rates of return likely to be available in future years can be obtained from a study of the rates which have been available over a period in the past. It is important that the period studied be long enough to include a variety of economic conditions. This is achieved by using a 20-year period. A period as long as 20 years allows the effect of a variety of economic conditions to be reflected in the results obtained. It reduces the fluctuations and distortions which can occur, over shorter periods of time, due to business conditions and government controls.

For this Report we have used the 20-year period from January 1st, 1970 to December 31st, 1989. We calculated the average rate of return on each category of fixed income investment in which net new investments have been made for the Fund during the last 6 years. The results are shown in the following table:

Investment Category	20-Year Average Rate of Return	Basis
Federal Bonds	10.22%	Long-term Federal Bonds
Provincial Bonds	10.91	S.M. Provincial Bonds
Corporate Bonds	11.14	S.M. Industrial and Utility Bonds
General Bonds	10.95	S.M. 40 Bond Yield Average
Conventional Mortgages	11.71	Conventional mortgage interest rates less 3/8 of 1% for servicing

Similar results have not been provided for equity investments since, unlike fixed income investments, an equity investment is attractive only if there is an increase in the value of the investment during the term of the investment. Over long periods in the past, these increases in value have been sufficient to cause the rate of return obtained on equities to exceed the

rate of return on fixed income investments. In the last 20 years, there have been significant fluctuations in the value of equity investments. As a result, the dates on which such investments are purchased and sold have an important influence on the results that are obtained.

It has been assumed that, in future, it will be possible to choose these dates with sufficient skill so that the rate of return obtained on equity investments is at least equal to the rate of return which could have been obtained on fixed income investments. As it is possible to allocate all of the Fund to fixed income investments, it is reasonable to assume that existing investments in equities will be retained, and new investments in equities will be made, only if such investments are expected to produce a higher rate of return than can be obtained on fixed income investments. Otherwise, investments in equities would not be justified.

The amounts invested in short-term investments have been excluded from this tabulation. Such investments are used to produce income for the Fund until it is appropriate to make more permanent investments. Use of this procedure helps to increase the rate of return earned by the Fund.

Over the 6-year period prior to the valuation date, the new fixed income investments of the Fund were distributed by category in the following proportions:

Investment Category	Proportion
Federal Bonds	6.03%
Provincial Bonds	6.62
Corporate Bonds	58.33
General Bonds	1.23
Conventional Mortgages	27.79
Total	100.00%

This information can be used to determine the rate of return which is expected to be obtained in future years if it is assumed that:

(i) the distribution of new fixed income investments by category over the 6-year period is a good representation of the investment policy which will be followed in the future,

(ii) the rates of return obtained in the future on each category of fixed income investment will be at least as high as

the average rate of return obtained during the 20-year period prior to the valuation date, and

(iii) any equity investments will produce at least as high a rate of return as fixed income investments.

A rate of return of 11.23% per year is produced by the use of this distribution of new fixed income investments and the 20-year average rate of return obtained on each category of fixed income investment.

A decrease in the rate of return has an adverse effect on the financial position of the Fund. This adverse financial effect is experienced even if there is a corresponding reduction in the rate of inflation.

It is desirable to make allowance for the possibility that the rates of return which are available in future will be less than the rates of return which were available during the latest 20-year period.

This allowance could be made by excluding from the calculation the very high rates of return that were available during 1981 and the first 6 months of 1982. During this period of time, the rates of return on new bond issues varied from 14% to 20% per year. If this is done, the 20-year average rate of return becomes 10.76% per year.

Allowance also needs to be made for:

(i) the expected costs of managing investments in bonds. The investment related costs were equal to .11 of 1% of invested assets during 1989. These costs have increased over the latest 3 years as a result of the more active management of this component of the portfolio. Allowance has been made for a further increase in these costs in the future, and

(ii) the allocation made to the investment reserve each year. This allocation is equal to .10 of 1% of the book value of investments per year.

The rate assumed is also affected by the following considerations.

During the 9-year period the financial markets enabled investors to get very favourable rates of return. The rates of return have been especially favourable for investments in bonds and mortgages. The differences between the rates of interest on these investments and the rates of inflation have been several times the differences that were available in the past. In the

past such periods have been followed by periods when the rate of return has not been as favourable.

It is important to take into account the effect which a decrease in the rate of inflation will have on the rates of return obtained in future. The need to make allowance for this possibility is greater when the rate of inflation currently being experienced is less than the rate of inflation experienced over the applicable parts of the 20-year period.

As a result, an allowance equal to .25 of 1% has been made for lower rates of inflation in the future.

A further consideration is the removal of the guarantee which had been provided by the Province of Manitoba. The guarantee was removed in September, 1986. This guarantee became operative if, in a year, the rate of return obtained for the Fund was not at least .50 of 1% more than the rate of return assumed in the most recent actuarial valuation.

On the basis of the foregoing considerations, it is reasonable to expect that the Fund will earn a rate of return of at least 9.25% per year, on average, in the future.

The following table summarizes the adjustments made in determining the assumed rate of return:

Calculation based on 20-year averages and 6-year distribution of new fixed income investments	11.23%
Effect of removing 1981 and the first 6 months of 1982 from 20-year averages	(.47)
Allowance for cost of managing investments in bonds	(.15)
Allowance for allocation to investment reserve	(.10)
Allowance for lower rates of inflation	(.25)
Allowance for less favourable investment experience in the future	(1.01)
Assumed rate of return	9.25% per year

The assumed rate of return will be the same as the actual rate if there is no change in the distribution of new fixed income investments by category, and no gains or losses are realized

on the sale of these investments. The same or better results would be achieved if any losses are more than offset by an increase in investment income.

A portion of the assumed rate of return is attributable to the expectation that inflation will exist in the future. Inflation causes a decrease in purchasing power. Knowledgeable investors have sought to offset this decrease by charging rates of interest which, on average, make allowance for the expected rate of inflation during the term of the investment. This allowance is added to the real rate of return desired by the investor to produce the rate of interest charged on that investment.

This decrease in purchasing power can be measured by determining the annual rate of increase in the Consumer Price Index. During the 20 years ending December 31st, 1989, the Consumer Price Index increased by an average of 6.89% per year.

This increase is also affected by the elimination of the increases in the Consumer Price Index during 1981 and the first 6 months of 1982 from the period covered by the average. If that is done, the increase in the Consumer Price Index over the period is 6.46% per year. If allowance is made for lower rates of inflation in the future the assumed rate of inflation becomes 6.25%. This is similar to the allowance made in determining the assumed rate of inflation.

If the inflationary component in the assumed rate of return of 9.25% is 6.25%, the real rate of return is expected to be 3.00% per year. In our 1986 Report, the assumed rate of return was equal to 9.25% per year and the inflationary component was 6.50% per year. The real rate of return was expected to be 2.75% per year.

There are 2 reasons for identifying the 2 parts of the rate of return. These are:

(i) to ensure consistency in the choice of economic assumptions. The assumed rate of return is based on an assumption as to future economic conditions. So also is the assumption made as to the rate at which salaries will increase in future years. Consequently, in order to ensure consistency, the same allowance for inflation, i.e. 6.25% per year is used in developing both actuarial assumptions, and

(ii) to give a good indication of the rate of return required to be obtained. The assumption of a real rate of return of 3.00% per year implies that new investments obtained

for the Fund are expected to yield a rate of return of 3.00% per year in excess of the average rate of inflation during the period that these investments are held.

(b) Rates of Salary Increase

Salary increases occur as a result of:

(i) general increases. These increases in salary are granted to all employees and reflect changes in economic conditions,

(ii) service, merit and promotional increases. These increases in salary are granted on an individual basis to recognize an employee's service and increased value to the organization, and

(iii) accrued vacation pay being included in salary at the date of retirement.

Each class of increase is considered separately in developing the rates at which salaries can be expected to increase in the future.

(i) General Increases in Salary Levels.

The 2 components of general increases in salaries are:

(A) the inflationary component. Employees seek increases in salary in order to offset any decreases in purchasing power which are caused by inflation, and

(B) the productivity component, or increase in the standard of living component. The productivity component consists of that portion of general increases in salaries which are not offset by inflation. These increases are due to factors such as increases in the real value of goods and services produced per employed person. An increase in productivity is made possible by the greater use of automated or other equipment. Other increases can occur as a result of increases in qualifications needed to fulfill a position.

The inflationary component of future increases in salaries should be the same as the inflationary component included in the rate of return assumed to be earned on the Fund in future years. As explained in the previous subsection of this Report, the procedure used requires the allowance made for inflation in the future to be at the rate of 6.25% per year.

The productivity component is based on a study of increases in the average salaries of employed persons in Canada during the 20-year period prior to December 31st, 1989. The productivity component is obtained by deducting the inflationary component from these increases in salaries. During this period, the productivity component was equal to .78 of 1% per year.

The productivity component is affected by changes in business conditions.

Periods of below average increases in salary due to productivity tend to be followed by periods of above average increases in salary due to this cause.

As a result, an allowance of 1.00% per year was made for the productivity component of general increases in salary. This allowance is the same as the allowance which was made in the 1986 Report.

The expected general increases in salary in future are obtained by adding together the increases expected to occur in each component. On that basis, general increases in salary are expected to occur at a rate equal to 7.25% per year, on average. This rate consists of an average expected productivity increase of 1.00% per year plus an allowance for future inflation at a rate of 6.25% per year.

(ii) Service, Merit and Promotional Increases.

The following table shows, for each age group of employees, the rates of service, merit and promotional increases which have been adopted for use in this Report. Separate rates for male and female employees have been adopted as the experience of the Fund indicates that a statistically significant difference in salary patterns exists.

Assumed Annual Rates of Increase due to Service, Merit and Promotion

Ages	Males	Females
20 - 25	6.4%	5.2%
25 - 30	4.4	3.5
30 - 35	2.9	2.5
35 - 40	1.9	1.9
40 - 45	1.1	1.8
45 - 50	.8	1.2
50 - 55	.6	.9
55 - 60	.6	.7
60 - 65	.5	.6

These rates were obtained by first making a study of the actual rates of increase in salary for service, merit and promotional increases among employees. The results of the study were then compared to the previously adopted salary scales.

The following procedure was used in this study.

The average salary received during 1989 by a group of employees in the same quinquennial age and length of service subdivision was compared with the average salaries of other groups of employees who, on average, are 5 years older with 5 more years of service, are 10 years older with 10 more years of service, are 15 years older with 15 more years of service and so on. For this purpose, we excluded the salaries of those employees who are receiving more than twice as much or less than half as much salary as the average employee in that age and service group.

The study made indicated that the salary scales for service, merit and promotion for males and females were a reasonable reflection of the actual salary increases granted. As a result, the existing salary scales for service, merit and promotion have been continued in use for this Report.

(iii) Amount of Accrued Vacation Pay.

Accrued vacation pay at the date of retirement is used in the calculation of the amount of pension. Many employees have accrued at least 5 weeks of vacation at the date of retirement. Some employees have accrued the maximum number of 50 vacation days that can be used in the calculation of the amount of pension. Based on a review of a number of examples, it has been anticipated that, on average, an employee will have 35 days of vacation accrued at the date of retirement. This means that each employee's average annual salary will be 2.68% larger, due to the use of vacation pay in the calculation of this average.

(c) <u>Rate of Increase in Earnings under the Canada Pension Plan</u>

Each employee is accumulating benefits under the Canada Pension Plan. Benefits accumulate on all salary up to what is called the Yearly Maximum Pensionable Earnings (Y.M.P.E.).

These benefits affect the rate of contribution paid by employees participating under the Act and the rate at which benefits accumulate under the Act.

For a number of years the Y.M.P.E. increased at the rate of 12.50% per year. Increases at this rate occurred until these earnings reached the average annual wage for employed persons in Canada. This occurred in 1986. Thereafter these earnings increase at the same rate as the average annual wage rate for employed persons in Canada. This average annual wage rate is based on the Industrial Composite of Average Weekly Wages and Salaries computed by Statistics Canada (Index).

We have assumed that, in future, this Index will increase at the same rate as the allowance made for general increases in salaries, 7.25% per year.

(d) Rate at which Interest is Expected to be Credited on Required Contributions

A cash settlement can be paid to an employee whose service terminates or to the beneficiary of an employee who dies in service. The cash settlement is equal to the employee's required contributions, with interest.

The rate of interest credited is determined in accordance with the following procedure.

Contributions made for service before January 1st, 1984 are credited with interest at the rate of 3% per year.

Contributions made for service on or after January 1st, 1984 are credited with interest each year at a rate based on the moving average of the rates of interest credited on non-chequing savings accounts operated by the major chartered banks in Canada.

A good indication of the rates of interest likely to be credited in the future can be obtained from a study of the rates of interest which have been allowed on non-chequing savings accounts during the 20-year period ending December 31st, 1989. During this period, the average rate of interest was 7.50% per year. If the rates of interest credited during 1981 and the first 6 months of 1982 are removed from the average, the average rate of interest is 6.92% per year.

Allowance should be made for the possibility of lower rates of inflation in the future. This is consistent with the allowance made in computing the assumed rate of return and the allowance for inflation.

On the basis of these considerations, it is reasonable to anticipate that, in future, interest will be credited on required contributions at a rate equal to 6.75% per year.

(e) Expenses of Administering the Fund

In the 1986 Report, we indicated that the present value of the expenses expected to be incurred in administering the Fund in 1987, 1988 and 1989 was equal to $3,060,600. This present value is equivalent to expected administrative expenses of $3,500,800 during 1987, 1988 and 1989. The actual administrative expenses were equal to $3,321,000 during these 3 years.

The expenses of administering the Fund during 1990, 1991 and 1992 have been calculated. It is assumed that expenses will increase at the same rate as salaries.

Recent changes to the Income Tax Act may cause a significant increase in queries by members. If this occurs, administrative expenses will increase. The impact of this change on expenses will be ascertained for the next Report.

The allowance made reflects the decision to require participating employers to pay 50% of these expenses.

The employers will not pay any of the costs of managing the investments of the Fund.

This part of the cost is deducted in determining the assumed rate of return.

On this basis, the present value of the portion of expenses to be paid by the Fund is equal to $1,807,300. This amount is shown on the Valuation Balance Sheet as a provision for future expenses.

(f) Incidence of Death After the Date the Pension Commences

The study of the incidence of mortality after the date the pension commences differentiated between:

(i) employees who retired in at least average health,

(ii) employees who received a pension due to total disability, and

(iii) survivors of employees who died in service or while in receipt of a pension.

This separation makes it possible to recognize any differences in the rates of mortality which are due to the way in which the pension commenced.

The results of this study are shown in the following table:

		1987 - 1989		1981 - 1989	
		Actual	Expected	Actual	Expected
Males	- Non-disabled	421	448	1,055	1,092
	- Disabled	26	29	72	75
	- Survivors	6	7	11	13
Females	- Non-disabled	113	116	293	287
	- Disabled	7	10	23	26
	- Survivors	57	55	93	109
Total		630	665	1,547	1,602

The actual number of deaths amongst non-disabled males was less than the number expected during the 3-year period and 9-year period prior to the valuation date.

The mortality experience for the period prior to the commencement of the pension also reveals the same trend of the less than expected number of deaths.

As a result, it was decided to reduce the rates of mortality applicable to this group.

The reduction to these rates of mortality was made by adopting a current mortality table but with a percentage adjustment to reflect the desired new level of expected number of deaths.

The actual number of deaths amongst non-disabled females was less than the number expected during the 3-year period but greater than the number expected during the 9-year period prior to the valuation date.

There is a natural relationship between the mortality applicable to males and the mortality applicable to females.

There is more experience accumulated amongst males than that accumulated for females.

As a result, it was decided to also reduce the rates of mortality applicable to non-disabled females.

The reduction in these rates of mortality was made by adopting the corresponding mortality table for females but with a percentage adjustment to reflect the desired new level of expected number of deaths.

On the basis of these new rates of mortality we would have expected 983 deaths amongst non-disabled males and 258 deaths amongst non-disabled females during the 9-year period prior to the valuation date.

The actual number of deaths amongst disabled pensioners was less than the number expected to occur during the 3-year period and 9-year period prior to the valuation date.

For the 1986 Report, the rates of mortality for disabled male pensioners were decreased by 10%. For this Report, a 10% reduction was made to the rates of mortality for both disabled male and female pensioners.

On the basis of these new rates of mortality we would have expected 67 deaths amongst disabled male pensioners and 24 deaths amongst disabled female pensioners during the 9-year period prior to the valuation date.

There is much less accumulated experience available on survivors. It is normal to expect the same rates of mortality applicable to non-disabled pensioners to also be applicable to survivors of the same age and sex. This practice was used for the 1986 Report.

As a result, the rates of mortality adopted for survivors are the same as the rates adopted for non-disabled pensioners of the same sex.

(g) Incidence of Death Prior to the Date the Pension Commences

(i) Leading to a Cash Settlement or a Spouse's Annuity.

Each employee who dies prior to the date the pension commences results in the payment of either a cash settlement or a spouse's annuity.

A study was made of the incidence of death in service amongst employees contributing to the Fund.

The results of this study are shown in the following table:

	1987 - 1989		1981 - 1989	
	Actual	Expected	Actual	Expected
Males	106	172	325	495
Females	32	43	92	111
Total	138	215	417	606

The actual number of deaths amongst males and females was less than the number expected to occur during the 3-year period and 9-year period prior to the valuation date.

This pre-retirement mortality experience is consistent with the post-retirement mortality experience. For the post-retirement period the rates of mortality were lowered.

It was decided to lower the rates of mortality applicable to the pre-retirement period and to preserve the relationship between the pre-retirement mortality rates and the post-retirement mortality rates.

As a result, the rates of mortality were reduced. The reduction was made by adopting a current mortality table which approximated the desired number of expected deaths.

On the basis of these new rates of mortality we would have expected 388 deaths amongst males and 84 deaths amongst females during the 9-year period prior to the valuation date.

(ii) Proportion of Employees With a Spouse.

If an employee dies after the completion of 10 years of service and is survived by a spouse, the spouse is entitled to an annuity in respect of all service equal to 60% of the accrued pension. For service after 1984, this benefit is equal to 60% of the accrued pension commencing immediately or the amount which can be provided by the commuted value of the pension which has been accrued by the employee.

If there is no surviving spouse or other eligible survivor, the death benefit is equal to the employee's contributions with interest. For service after 1984, the cash settlement is equal to the greater of the employee's contributions with interest or the commuted value of the accrued pension.

If an employee dies after the completion of 2 years of service but before the completion of 10 years of service and is survived by a spouse, the spouse is entitled to an annuity in respect of service after 1984. The value of this annuity is equal to the greater of the employee's contributions with interest or the commuted value of the accrued pension. If there is no surviving spouse or other eligible survivor, the cash settlement for service after 1984 is equal to the greater of the employee's contributions with interest or the commuted value of the accrued pension.

As a result, it is necessary to estimate the likelihood that an employee at each age will have a spouse. It is

also necessary to estimate the age relationship between the employee and the spouse. The proportions and age relationships resulted from use of the following procedures. Information was produced by studies made some time ago. This information has been modified to reflect the effect of changes in the proportions of males and females in the labour force.

(h) Incidence of Termination of Service

(i) Leading to a Cash Settlement or a Deferred Pension.

Each employee whose service terminates prior to retirement is entitled to receive either a cash settlement, a deferred pension, or both.

The results of the study of the incidence of termination of service are shown in the following table:

	1987 - 1989		1981 - 1989	
	Actual	Expected	Actual	Expected
Males	1,747	1,342	4,254	3,909
Females	2,234	3,040	6,641	9,012
Total	3,981	4,382	10,895	12,921

The foregoing tabulations include all employees whose service terminated prior to retirement. More meaningful results can be obtained by excluding those employees whose service is not financially significant. A termination is considered to be financially significant if the terminating employee has completed at least 5 years of service or more than one-half of the average period of service which has been completed by employees of the same age.

The results of the study of the incidence of significant terminations of service are shown in the following table:

	1987 - 1989		1981 - 1989	
	Actual	Expected	Actual	Expected
Males	921	704	2,259	2,754
Females	1,136	1,634	3,759	6,088
Total	2,057	2,338	6,018	8,842

The actual number of terminations amongst males was greater than the number expected during the 3-year period but less than the number expected during the 9-year period prior to the valuation date.

It is desirable to have the number of terminations exceed the number expected, as this situation tends to have a favourable financial effect on the Fund.

As a result, the existing rates of termination applicable to males were continued in use for this Report.

The actual number of terminations amongst females was less than the number expected during the 3-year period and 9-year period prior to the valuation date.

The difference is large enough to require a reduction in the rates of termination applicable to females.

The decrease in the termination rates applicable to females was made so that it caused a 25% reduction in the difference between the actual number of terminations and the number expected to occur during the 9-year period prior to the valuation date.

On the basis of these new rates of termination we would have expected 5,506 terminations amongst females during the 9-year period prior to the valuation date.

(ii) Proportion Electing a Deferred Pension.

On termination of service, an employee who has completed at least 2 years of service is entitled to a deferred pension. The provisions of the Act in regards to the choice of a deferred pension or a cash settlement are as follows:

If the employee has attained age 45 and completed 10 years of service, the employee must receive a deferred pension for service after July 1st, 1976. For service completed prior to July 1st, 1976, the employee may elect a deferred pension or cash settlement.

If the employee has not satisfied the '45 & 10' rule but has completed 2 years of service, the employee must receive a deferred pension for service on or after January 1st, 1985. For service before January 1st, 1985, the employee may elect a cash settlement.

The ability to elect a cash settlement is decreasing. This ability is decreasing because fewer of the employees whose service terminates have some service in the years in which

a cash settlement can be chosen. For example, in 1990 an employee must have at least 5 years of service completed at the date of termination to have any service prior to January 1st, 1985 in respect of which he may elect a cash settlement. An employee who is age 45 and has completed at least 10 years of service must have at least 14 1/2 years of service in order to have any service prior to July 1st, 1976 for which he may be able to choose a cash settlement.

The portion of the service completed prior to either July 1st, 1976 or January 1st, 1985 decreases with each future year.

As a result, it was decided for the purposes of this Report to assume that all employees terminating after the completion of 2 years of service will elect a deferred pension in respect of all service.

Deferred pensions are increased for the period between the date of termination and the date of commencement of the pension.

These increases in deferred pension are not financed by the contributions allocated to the Superannuation Adjustment Account but rather are financed out of basic contributions. As a result, the liabilities generated by the increases in deferred pensions are reflected in the liabilities of the Fund.

Increases in deferred pensions are granted whenever there are increases in existing pensions. Each increase granted in deferred pensions is the same as the increase granted in existing pensions. It is expected that the increases granted in existing pensions will be, on average, equal to 2/3 of the rate of inflation. As a result, it has been assumed that each deferred pension will be increased for the period between the date of termination and the date of commencement of the pension at a rate equal to 2/3 of the assumed rate of inflation.

(i) Incidence of Becoming Disabled

The results of the study made of the incidence of employees becoming disabled are shown in the following table:

	1987 - 1989		1981 - 1989	
	Actual	Expected	Actual	Expected
Males	45	65	128	166
Females	17	53	57	112
Total	62	118	185	278

The number of disablements amongst males and females was less than the number expected during the 3-year period and 9-year period prior to the valuation date.

The recorded number of disablements amongst females in the latest 3-year period is significantly less than the recorded number of disablements for the prior 3-year period.

The existing rates of disablement have been found to be appropriate for other plans with similar disability benefit provisions.

In view of these considerations it was decided to make no change to the existing rates of disablement at this time. The existing rates of disablement have been continued in use for this Report.

For the next Report a further review will be made of the rates of disablement. If the actual number of disablements continues to be less than the number expected a reduction in the expected rates of disablement will be made.

(j) Incidence of Retirement for Reasons Other than Total Disability

The results of the study of retirement, for reasons other than total disability, are shown in the following table:

	1987 - 1989		1984 - 1989	
	Actual	Expected	Actual	Expected
Males	1,063	627	1,936	1,402
Females	389	263	673	560
Total	1,452	890	2,609	1,962

The actual number of retirements amongst males and females was greater than the number expected during the 3-year period and the 9-year period prior to the valuation date.

A study of the age by age retirement experience indicated that, at most ages, the actual number of retirements was greater than the number expected. The excess of the actual number of retirements over the number expected was greatest at ages 55 to 60.

The retirement experience continues to indicate retirements above age 65.

As a result, the rates of retirement have been changed. The change made caused a 25% reduction in the difference between the actual number of retirements and the number expected at each age.

The retirement rates continue to anticipate that there will be some retirements at ages 66 and 67. It is assumed that all employees reaching age 67 will retire.

On the basis of these new rates we would have expected 1,536 retirements amongst males and 588 retirements amongst females during the 6-year period prior to the valuation date.

6. Summary of Actuarial Assumptions Used in this Report

(a) Annual Rate of Return on the Assets of the Fund - 9.25% per year.

Annual Rate of Inflation Included in Rate of Return - 6.25% per year.

(b) Annual Rates of Salary Increase (including an allowance of 7.25% per year for future general increases in salary levels):

Age	Males	Females
20 - 25	14.1%	12.8%
25 - 30	12.0	11.0
30 - 35	10.4	10.0
35 - 40	9.2	9.3
40 - 45	8.4	9.2
45 - 50	8.1	8.6
50 - 55	7.9	8.2
55 - 60	7.9	8.0
60 - 65	7.8	7.9
65 - 67	7.3	7.3

In addition, allowance is made for an increase in the average annual salary at the date of retirement. This allowance is equal to 2.68% and is due to the use of accrued vacation pay in the calculation of average annual salary.

(c) Earnings Under the Canada Pension Plan - increases in these Earnings will occur at the same rate as the allowance made for general increases in salary - 7.25% per year.

(d) Annual Rate at Which Interest is Expected to be Credited on Required Contributions - 6.75% per year.

(e) Provision for Fund's portion of Future Administration Expenses (during the next 3 years) - $1,807,300.

(f) Annual Rates of Death After the Date the Pension Commences (for selected ages):

Attained Age	Non-Disabled		Disabled		Survivors	
	Males	Females	Males	Females	Males	Females
30	-	-	-	-	.0007	.0004
40	-	-	.0551	.0304	.0014	.0007
50	-	-	.0491	.0271	.0044	.0018
60	.0103	.0045	.0520	.0286	.0103	.0045
70	.0309	.0132	.0708	.0390	.0309	.0132
80	.0832	.0457	.1275	.0703	.0832	.0457
90	.1868	.1190	.2532	.1395	.1868	.1190
100	.3584	.3144	1.0000	1.0000	.3584	.3144

(g) Annual Rates of Death Prior to the Date the Pension Commences (for selected ages):

(i) leading to a cash settlement or a spouse's annuity:

Attained Age	Males	Females
20	.0004	.0002
30	.0006	.0003
40	.0012	.0007
45	.0022	.0010
50	.0039	.0016
55	.0061	.0025
60	.0092	.0042
65	.0156	.0071

(ii) proportion of employees with a spouse:

Attained Age	Males	Females
20	.330	.350
30	.900	.684
40	.933	.700
45	.935	.678
$\geq$50	.900	.710

(h) Annual Rates of Termination of Service (for selected ages):

(i) leading to a cash settlement or a deferred pension:

Attained Age	Males	Females
20	.1100	.1968
30	.0452	.1142
40	.0187	.0395
45	.0133	.0328
50	.0098	.0239
55	.0063	.0151
60	.0039	.0080
62	.0031	.0096

(ii) proportion of eligible terminations expected to elect a deferred pension - Employees who terminate after the completion of 2 years of service are expected to choose a deferred pension in respect of all service.

Deferred pensions are increased by a rate equal to 2/3 of the assumed rate of inflation (2/3 x 6.25% = 4.17%) for the period between the date of termination and the date of commencement of the pension.

Each deferred pension is assumed to commence at age 55 if 10 years of service have been completed or at age 65 if less than 10 years of service have been completed.

(i) Annual Rates of Becoming Disabled (for selected ages):

Attained Age	Males	Females
35	.0003	.0008
40	.0008	.0015
45	.0013	.0025
50	.0020	.0038
55	.0041	.0070
59	.0098	.0126

(j) Annual Rates of Retirement for Reasons Other Than Total Disability (for selected ages):

Attained Age	Males	Females
55	.0834	.1061
57	.0485	.0557
59	.0640	.0670
61	.1280	.1389
63	.1662	.1919
65	.8362	.8545
67	1.0000	1.0000

7. Valuation Results - Present Participants in the Fund

(a) Responsibility for the payment of benefits

The Fund consists of the accumulation of those contributions and other payments that were made during the period of employment of the present participants. This accumulation will be used to finance a portion or all of the benefits which these participants have been promised under the Act. The portion of the benefits so financed includes:

(i) a specified portion of each pension currently being paid, excluding that part of the pension which is charged to the Superannuation Adjustment Account (Account),

(ii) 50% of the pensions accrued by those present employees who are not employed by an employer who is matching employee contributions,

(iii) cash settlements paid on termination of service (refunds of employee contributions plus interest),

(iv) the value of employee contributions transferred under reciprocal agreements,

(v) cash settlements paid on death before retirement (employee contributions),

(vi) 50% of the commuted value of pensions or benefits generated as a result of service after January 1st, 1985,

(vii) 100% of the value of the excess contributions made by employees for service on or after January 1st, 1985, and

(viii) 100% of the pensions and other benefits provided to employees for service while employed by an employer who matched the contributions made by employees.

The remainder of the benefits are financed by the Province and its agencies on a pay-as-you-go basis.

This valuation relates to the benefits which accrued during employment and the assets and contributions available to finance these benefits. The portion of the benefits to be financed by the Province and its agencies are not considered to be a liability of the Fund.

(b) Valuation Procedure

The entry age actuarial cost method of valuation has been used for this Report.

The objective of this method is to accumulate the funds to a level which, if supplemented by future contributions made at the rates presently required, will be sufficient to finance the benefits expected to be provided as a result of service to the valuation date and the benefits expected to accrue for service in the future.

The financial position of the Fund is indicated by the relationship between:

(i) the present value of the liabilities of the Fund in respect of the benefits promised, and

(ii) the present value of the funds available to finance these liabilities as they become due.

The actuarial valuation is the process whereby this relationship is quantified.

The present value of the liabilities of the Fund is determined separately for each benefit which the Fund provides. For each benefit, each employee, and each future year of service in the Fund, we determine:

(i) the probability of a benefit becoming payable at each future age based on the actuarial assumptions outlined in the previous Section of this Report,

(ii) a discount factor which makes allowance for the portion of the benefit which is expected to be financed by future investment earnings, and

(iii) the amount of the expected benefit. The benefit expected to be paid is based on service completed prior to the valuation date, plus service expected to be completed after the valuation date but prior to the occurrence of the event that causes the benefit to be paid. The expected benefit is calculated using the salary expected to be received prior to the occurrence of this event.

The present value of the liabilities for each benefit for each employee is the sum of the product of these 3 components over all possible future years of service for that employee. The present value of the liabilities for each benefit is the sum of the present values obtained for all employees.

The present value of the liabilities of the Fund in respect of pensioners and former employees entitled to a deferred pension is determined by a similar process. For such participants, the amount of the benefit is based on the amount of pension being paid at the valuation date or the amount of pension which will become payable in the future, whichever is applicable.

The principal sources of funds available to finance the liabilities of the Fund are:

(i) the present assets of the Fund, and

(ii) the contributions expected to be made to the Fund by the employees and those employers who are matching employee contributions.

The value of future contributions does not include the proportion of contributions allocated to the Account. At present, 10.20% of employee contributions are allocated to the Account. The portion of contributions allocated to the Account can be used only to finance increases in pensions when there are increases in the cost of living after the pension commences. The value of future pensions does not include any allowance for the additional pensions which are expected to be produced by such contributions.

Provision is made, however, for expected increases in each deferred pension for the period between the date of termination of service and the commencement of these pensions. These increases are financed by contributions not allocated to the Account.

New entrants to the Fund in future years will affect the financial position of the Fund. Their number and distribution by age, sex and salary is less easy to predict than the other factors taken into account in the valuation. Consequently, the effect which new entrants will have on the financial position of the Fund has been considered separately and is discussed in a subsequent Section of this Report.

The financial position of the Fund with respect to the present participants is shown in the Valuation Balance Sheet.

Civil Service Superannuation Fund
Valuation Balance Sheet
as at December 31st, 1989

ASSETS

Invested Assets:		
Fixed Income (amortized cost)	$741,767,000	
Less: Provisions for investment losses	(940,000)	
Money Purchase Account	(1,205,000)	
Superannuation Adjustment Account (Note 2)	(51,853,000)	
Transfer to Adjustment Account	(35,626,985)	$ 652,142,015
Equities (adjusted book value)		199,878,000
Net Invested Assets		$ 852,020,015
Accounts Receivable		821,000
Amount due from Province under Section 24(1)		1,826,000
Accumulated Unrealized Foreign Exchange		1,457,000
Computer Equipment and Systems Development		427,000
Value of Future Contributions Expected to be Received		
- present employees	$689,625,900	
- employers who are matching employee contributions	10,003,000	699,628,900
TOTAL ASSETS		$1,556,179,915

LIABILITIES

Value of Fund's Liabilities in respect of Current Benefits		
- retirement pensions	$205,828,600	
- survivors' pensions	16,354,800	$ 222,183,400
Value of Fund's Liabilities in respect of Future Benefits Earned for Service to December 31st, 1989		
(a) present employees		
- retirement pensions	$454,615,900	
- survivors' pensions	26,473,700	
- deferred pensions	64,211,900	
- cash settlements on death	2,113,000	
- cash settlements on termination	619,800	
- refunds due to 50% test	17,146,100	
(b) former employees		
- deferred pensions	11,419,100	576,599,500
Value of Fund's Liabilities in respect of Future Benefits for Service on and after January 1st, 1990 by present employees:		
- retirement pensions	$576,702,400	
- survivors' pensions	34,305,800	
- deferred pensions	61,001,500	
- cash settlements on death	5,144,300	
- cash settlements on termination	780,800	
- refunds due to 50% test	18,425,200	696,360,000
Value of funds to be transferred under Reciprocal Agreements		771,200
Value of deferred pensions to be paid as a result of transfers to reciprocating Manitoba employers		5,432,200
Accounts Payable (Note 3)		2,534,500
Provision for Future Administration Expenses		1,807,300
Instalment payments to include prior non-pensionable employment under Section 53		91,000
Instalment payments to include periods of war service under Section 35		8,600
TOTAL LIABILITIES		$1,505,787,700
SURPLUS		$ 50,392,215

Notes:

1. The portion of the invested assets which is attributable to the Money Purchase Account has been deducted from the assets of the Fund. This portion is credited to former employees for whom a benefit has been determined. None of these assets are available to help finance the other benefits promised under the Act.

2. The portion of the invested assets which is attributable to the Superannuation Adjustment Account has been deducted from the assets of the Fund. This portion is used to finance increases in pensions granted as a result of increases in the cost of living after the pension commences. None of these assets are available to help finance the other benefits promised under the Act.

3. The amount shown as accounts payable includes:

Accounts Payable	$ 290,000
Contributions and Interest Refundable	2,244,500
	$2,534,500

The Accounts Payable is the amount shown in the financial statements. The amount shown as contributions and interest payable was determined by adding up the amounts for those former employees entitled to a refund as at December 31st, 1989, but who had not been paid by that date.

8. Analysis of Valuation Results

The Valuation Balance Sheet discloses a surplus of $50,392,215 as at December 31st, 1989. In our 1986 Report, a surplus of $31,788,810 was disclosed.

The financial position of the Fund as at December 31st, 1989 can be reproduced if the surplus as at December 31st, 1986 is adjusted to recognize the various changes in the financial position which occurred since 1986. This procedure is demonstrated in the following schedule:

Surplus as at December 31st, 1986	$ 31,788,810
Amount to be transferred to Superannuation Adjustment Account January 1st, 1989	(26,633,700)
Effect of other amendments to the Act	356,900
Interest on balance at the rate assumed in the 1986 Report (9.25%)	1,675,400
Provision for Fund's portion of future Administration expenses	(1,815,700)
Effect of actual experience during period under review	60,663,905
Surplus as at December 31st, 1989, before allowance is made for changes in expected future experience	$ 66,035,615
Effect of changes in expected future experience	(15,643,400)
Surplus as at December 31st, 1989	$ 50,392,215

The following factors influenced the actual experience during the period under review and improved the financial results:

(a) The greater than assumed rate of return on investments made for the Fund. The improvement in financial position due to this source is equal to $31,880,300. Of this amount, $8,683,500 is attributable to the excess interest earnings on the assets supporting the liabilities for participants who were on pension during this period.

(b) The smaller than expected increases in salaries. The improvement in financial position due to this source is equal to $49,851,200.

(c) The smaller than expected number of deaths prior to commencement of the pension.

The following factors influenced the actual experience during the period under review and had an adverse effect on the financial results:

(a) The smaller than expected number of deaths after the commencement of the pension.

(b) The smaller than expected number of terminations from service amongst females.

(c) The greater than expected number of retirements prior to age 65. The adverse effect on the financial position due to this source is equal to $10,424,600.

Each change made to the actuarial assumptions affects the financial position of the Fund.

The decrease in the assumed rates of mortality prior to commencement of the pension improved the financial results.

The following changes made to the actuarial assumptions had an adverse effect on the financial results:

(a) The decrease in the rates of mortality applicable after the commencement of the pension.

(b) The decrease in the rates of termination of service applicable to females.

(c) The increase in the rates of retirement applicable prior to age 65.

The net financial effect of the changes made to the actuarial assumptions is equal to $15,643,400 as at December 31st, 1989.

9. Valuation Results - Future New Entrants

As indicated earlier, the method used to determine the expected cost of benefits is known as the entry age actuarial cost method.

Under this method, the expected cost is calculated for all future new entrants. This cost is equal to the level percentage of salary needed each year, from the employee's date of entry into the Fund to the date of separation, to finance the benefits expected to be accrued by the employee for that service with a participating employer. The results of this calculation are called the theoretical contribution rates.

Future new entrants may have a significant effect on the Fund. This financial effect is determined by comparing:

(a) the required contribution rates under the Act, and

(b) the theoretical contribution rates.

The theoretical contribution rates are based on:

(a) the benefits and eligibility requirements which existed under the Act as at December 31st, 1989,

(b) the distribution of employees by age at entry, sex, and salary at December 31st, 1989, and

(c) the actuarial assumptions adopted for this Report.

On this basis, the theoretical rates compared to the required rates are as follows:

	Required Contribution Rates	Theoretical Contribution Rates	Margin
On C.P.P. portion of salary	4.58%	4.56%	.02%
On portion of salary in excess of C.P.P. earnings	6.29	6.26	.03

The existence of a margin in the contribution rates ensures that the financial position of the Fund will not be adversely affected when new entrants begin to contribute to the Fund.

In the past the participation of new entrants improved the financial position of the Fund. This is unlikely to be a significant factor in future since the margin in the rate of contribution is now much smaller than it was in the past.

10. Comments and Recommendations

During the last 3 years, the financial position of the Fund has been affected by changes in actual and expected experience. These changes are automatically reflected in the financial results obtained.

The results obtained indicate that there has been a significant improvement in the financial position of the Fund during the period under review.

The surplus is equal to 3.3% of the liabilities.

The benefits have been determined in accordance with the Act as it existed on December 31st, 1989.

Earlier in this Report we indicated that $8,683,500 of the surplus was attributable to excess interest earnings on the assets supporting the liabilities for participants who were receiving a pension.

During the 3-year period, the financial markets enabled investors to get favourable rates of return. It would be unrealistic to expect the indefinite continuation of this type of investment experience in the future. In the past, such periods have been followed by periods in which rates of return have not been as favourable.

Indexing at or near present levels is likely to be possible in future only if there is:

(a) an immediate transfer of a large proportion of this and future surpluses to the Superannuation Adjustment Account, or

(b) substantial increases in the rate of contribution allocated to the Account.

It is essential that these comments be reviewed before any use is made of the surplus.

11. Certification

In our opinion, for the purposes of this Report:

(a) the data on which this Report is based is sufficient and reliable,

(b) the assumptions which have been used in this Report are adequate and appropriate, and

(c) the methods employed in this Report are consistent with sound actuarial principles.

This Report has been prepared and this opinion has been given in accordance with generally accepted actuarial principles and the Recommendations of the Canadian Institute of Actuaries.

We hereby certify that, in our opinion, the assets of the Fund, together with the contributions expected to be received from, and on behalf of, the members of the Fund are sufficient to provide the benefits promised by the Act as these fall due.

We will be pleased to discuss this Report with you at your convenience.

DATED at Winnipeg, this 29th day of October, 1990.

Respectfully submitted,

John D. Turnbull

Actuary

Louis E. Clement

Actuary